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10/566,433	01/31/2006	Daisuke Mukai	5734-090631	5657
28289	7590	09/18/2009		EXAMINER
THE WEBB LAW FIRM, P.C. 700 KOPPERS BUILDING 436 SEVENTH AVENUE PITTSBURGH, PA 15219				ROE, JESSE E RANDALL
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,433	Applicant(s) MUKAI ET AL.
	Examiner Jessee Roe	Art Unit 1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 July 2009.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 6-12 and 14-23 is/are pending in the application.
- 4a) Of the above claim(s) 6-10,12,14 and 16 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 11 and 17-23 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date 7 July 2009
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application
 6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7 July 2009 has been entered.

Status of the Claims

Claims 6-12 and 14-23 are pending wherein claim 11 is amended, claims 1-5 and 13 are canceled, claims 6-10, 12, 14 and 16 are withdrawn from consideration, and claims 17-23 are new.

Status of Previous Rejections

The previous rejection of claims 11, 13 and 15 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is withdrawn in view of the Applicant's arguments. The previous rejection of claims 11, 13 and 15 under 35 U.S.C. 103(a) as being unpatentable over Yasuda et al. (US 6,372,059) is withdrawn in view of the Applicant's Declaration 1 Under 37 CFR §1.132.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11, 15 and 17-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

Claim 11 recites the broad recitation $5.2 \leq a+b+c+d \leq 5.5$, and the claim also recites $5.25 \leq a+b+c+d \leq 5.30$, which is the narrower statement of the range therefore rendering the scope of the claim indefinite.

Claim 21 recites the broad recitation $5.2 \leq a+b+c+d \leq 5.5$, and the claim also recites $5.30 \leq a+b+c+d \leq 5.35$, which is the narrower statement of the range therefore rendering the scope of the claim indefinite.

Claim 22 recites the broad recitation $5.2 \leq a+b+c+d \leq 5.5$, and the claim also recites $5.35 \leq a+b+c+d \leq 5.40$, which is the narrower statement of the range therefore rendering the scope of the claim indefinite.

Claim 23 recites the broad recitation $5.2 \leq a+b+c+d \leq 5.5$, and the claim also recites $5.40 \leq a+b+c+d \leq 5.45$, which is the narrower statement of the range therefore rendering the scope of the claim indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11, 15 and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko (US 6,261,517) alone, or alternatively in view of "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy" as submitted on the IDS of 7 July 2009.

In regards to claims 11 and 21-23, Kaneko et al. ('517) discloses a rare earth metal-nickel hydrogen storage alloy having a composition represented by the formula $RNi_a Mn_b Co_c Al_d X_e$, wherein R stands for one or more rare earth elements including Sc

and Y and misch metal may be used as a starting material for industrial production (abstract and col. 4, lines 30-40); X stands for one or more elements selected from the group consisting of Fe, Cu, Zn, V, and Nb (abstract); a, b, c, d, and e satisfy the relations of $3.9 \leq a \leq 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract); and the alloy would have a CaCu_5 structure (abstract), which overlaps the low Co hydrogen storage alloy having a CaCu_5 crystal structure and composition represented by the general formula $\text{Mm Ni}_a \text{Mn}_b \text{Al}_c \text{Co}_d$, wherein Mm is a Misch metal, $4.31 \leq a \leq 4.7$, $0.3 \leq b \leq 0.65$, $0.2 \leq c \leq 0.5$, $0 < d \leq 0.35$, and $5.2 \leq a+b+c+d \leq 5.5$ of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed hydrogen storage alloy from the hydrogen storage alloy disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) discloses the same utility throughout the disclosed ranges.

With respect to the recitation "wherein in a composition of $5.25 \leq a+b+c+d \leq 5.30$, the a-axis length of the crystal lattice of said CaCu_5 -type crystal structure is 500.5 pm and not more than 502.7 pm, and the c-axis length is not less than 405.6 pm and not more than 406.9 pm." of claim 11, these lattice dimensions would be expected in the structure disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) discloses the same or a substantially similar composition and structure in addition to substantially the same process (casting and vacuum heat treatment (col. 5, line 60 – col. 6, line 14). MPEP 2112.01 I. Alternatively, Kaneko et al. ('517) does not specify the claimed a-axis

lengths and c-axis lengths.

In the Remarks filed 7 July 2009 (see page 12 of 15, paragraph 4), the Applicant admits that "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy" teaches (last paragraph of page 93) that the axis length varies depending on heat treatment conditions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the heat treatment conditions, as disclosed by "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy", in the heat treatment process, as disclosed by Kaneko et al. ('517), in order to achieve the desired axis lengths, as disclosed by "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy" (last paragraph of page 93). MPEP 2144.05 II.

With respect to the recitation "wherein the pulverization residual rate obtained by the following equation is 50% or more: Pulverization residual rate (%) = (post-cycling particle size/pre-cycling particle size) x 100, when a hydrogen storage alloy is ground and screened to select particles with a particle size in the range of 20 μm and 53 μm to provide hydrogen storage alloy powder, and after measuring with a particle size distribution measuring device the average particle size (pre-cycling particle size, D_{50}) of the hydrogen storage alloy powder, 2 g of the hydrogen storage alloy powder is weighed and placed into a PCT holder; the surfaces thereof are cleaned twice under hydrogen pressure of 1.75 MPa; then activation is carried out twice by introducing hydrogen of 3 MPa; next a cycle test using PCT device is repeated 50 times, wherein

hydrogen gas of 3 MPa is introduced into 2.0 g of the hydrogen storage alloy powder to absorb hydrogen, and the hydrogen is desorbed at 45°C; and the average particle size of the hydrogen storage alloy powder after the test of the 50 cycles (post-cycling particle size, D_{50}) is measured with a particle size distribution measuring device" in claims 11 and 21-23, the Examiner notes that because Kaneko et al. ('517) discloses substantially the same composition and substantially the same process (casting and vacuum heat treatment this property would be expected. MPEP 2112.01 I. Furthermore, the language "when a hydrogen storage alloy is ground..." is language that suggests or makes optional but does not require steps to be performed. MPEP 2111.04.

In regards to claim 17, Kaneko et al. ('517) discloses $0.45 \leq b < 1.5$ for the formula $RNi_a Mn_b Co_c Al_d X_e$, which overlaps the range of $0.4 < b \leq 0.55$ as claimed (abstract).

In regards to claim 18, Kaneko et al. ('517) discloses $0.01 \leq c < 0.3$ for the formula $RNi_a Mn_b Co_c Al_d X_e$, which overlaps the range of $0 < d \leq 0.2$ for the $Mm Ni_a Mn_b Al_c Co_d$ as claimed (abstract).

In regards to claims 15, 19 and 20, Kaneko et al. ('517) discloses that the hydrogen storage alloy would be used as the anode material (negative electrode active material) for a battery(cell) (abstract and col. 7, lines 43-51).

Claims 11, 15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda et al. (US 6,372,059) alone, or alternatively in view of "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy" as submitted on the IDS of 7 July 2009.

In regards to claim 11, Yasuda et al. ('059) discloses a hydrogen storage alloy having a CaCu₅ structure represented by the formula MmNi_aMn_bAl_cCo_d wherein Mm denotes a misch metal, 4.0≤a≤4.3, 0.25≤b≤0.4, 0.25≤c≤0.4, 0.3≤d≤0.5, and 5.05≤a+b+c+d≤5.25. Although claim 11 recites the range 4.31≤a≤4.7, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. MPEP 2144.05 I.

With respect to the recitations "wherein in a composition of 5.25≤a+b+c+d≤5.30, the a-axis length of the crystal lattice of said CaCu₅-type crystal structure is 500.5 pm and not more than 502.7 pm, and the c-axis length is not less than 405.6 pm and not more than 406.9 pm." of claim 11, Yasuda et al. ('059) discloses that the a-axis would be usually 500.3 to 501 pm and the c-axis would be between 404.9 and 405.8 pm (col. 3, lines 40-60). Alternatively, Yasuda et al. ('059) does not specify the claimed a-axis lengths and c-axis lengths.

In the Remarks filed 7 July 2009 (see page 12 of 15, paragraph 4), the Applicant admits that "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy" teaches (last paragraph of page 93) that the axis length varies depending on heat treatment conditions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the heat treatment conditions, as disclosed by "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese

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Alloy", in the heat treatment process, as disclosed by Yasuda et al. ('059), in order to achieve the desired axis lengths, as disclosed by "Improvement of Characteristics of Hydrogen Storage of Mischmetal-Nickel-Manganese Alloy" (last paragraph of page 93). MPEP 2144.05 II.

With respect to the recitation "wherein the pulverization residual rate obtained by the following equation is 50% or more: Pulverization residual rate (%) = (post-cycling particle size/pre-cycling particle size) × 100, when a hydrogen storage alloy is ground and screened to select particles with a particle size in the range of 20 µm and 53 µm to provide hydrogen storage alloy powder, and after measuring with a particle size distribution measuring device the average particle size (pre-cycling particle size, D_{50}) of the hydrogen storage alloy powder, 2 g of the hydrogen storage alloy powder is weighed and placed into a PCT holder; the surfaces thereof are cleaned twice under hydrogen pressure of 1.75 MPa; then activation is carried out twice by introducing hydrogen of 3 MPa; next a cycle test using PCT device is repeated 50 times, wherein hydrogen gas of 3 MPa is introduced into 2.0 g of the hydrogen storage alloy powder to absorb hydrogen, and the hydrogen is desorbed at 45°C; and the average particle size of the hydrogen storage alloy powder after the test of the 50 cycles (post-cycling particle size, D_{50}) is measured with a particle size distribution measuring device" of claim 11, the Examiner notes that because Yasuda et al. ('059) discloses substantially the same composition and substantially the same process (casting and vacuum heat treatment this property would be expected (Examples). MPEP 2112.01 I. Furthermore, the

language "when a hydrogen storage alloy is ground..." is language that suggests or makes optional but does not require steps to be performed. MPEP 2111.04.

In regards to claims 15 and 19, Yasuda et al. ('059) discloses that the hydrogen storage alloy would be used as the anode material (negative electrode active material) for a battery (col. 4, lines 18-24).

In regards to claim 17, Yasuda et al. ('059) discloses $0.25 \leq b \leq 0.4$ for the formula $MmNi_aMn_bAl_cCo_d$, which overlaps the range of $0.4 < b \leq 0.55$ as claimed.

Response to Declaration 1 Under 37 CFR §1.132

Declaration 1 under 37 CFR 1.132 filed 7 July 2009 is insufficient to overcome the rejection of claims 11 and 15 based upon Kaneko (US 6,261,517) as set forth in the last Office action because Declaration 1 does not establish the criticality of the claimed ranges over the ranges disclosed by Kaneko (US 6,261,517). MPEP 716.02(d)(II).

Declaration 1 under 37 CFR 1.132 filed 7 July 2009 is insufficient to overcome the rejection of claims 11 and 15 based upon Yasuda et al. (US 6,372,059) as set forth in the last Office Action because although the composition of nickel in the Test alloy 090302 is the same as that disclosed in Yasuda et al. ('059) (i.e. 4.3), the levels of cobalt, manganese, and aluminum are not within the ranges disclosed by Yasuda et al. ('059) (i.e. 0.2, 0.7 and 0.5). Therefore, a direct comparison of the a-axis length and c-axis length of the alloy disclosed by Yasuda et al. ('059) with that of the instant invention cannot been made.

Response to Declaration 2 Under 37 CFR §1.132

Declaration 2 under 37 CFR 1.132 filed 7 July 2009 is insufficient to overcome the rejection of claims 11 and 15 based upon Kaneko (US 6,261,517) or Yasuda et al. (US 6,372,059) as set forth in the last Office Action because:

First, the Applicant declares: "A-axis length and c-axis length of hydrogen storage alloy are greatly influenced not only by composition of the alloy but also casting condition and heat treatment condition etc. Although component composition of alloy overlaps, there is a high possibility that a-axis length and c-axis length will not be the values which do not overlap if casting condition and heat treatment condition etc. are different. Therefore although component composition of alloy overlaps, a-axis length and c-axis length will not be expected to overlap.".

In response, Applicant has failed to provide evidence to support the conclusory statements set forth above and therefore the statements are not persuasive.

Second, the Applicant declares "At the time the present invention was made, lifetime characteristics such that pulverization residual rate would be 50% or more after 50 cycle test was desired for a battery which was mounted on a hybrid car. The inventor of the present invention discovered that pulverization residual rate could be 50% or more by specifying a value range of a-axis length and c-axis length at each range of ABx in a specified alloy component. Such finding is the first discovered by conducting examples in the present specification, characterizing (organizing) a relationship among a-axis length and c-axis length and pulverization residual rate at each range of ABx as showing table 6 to table 10. Moreover, such finding is unknown to date. Therefore what

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pulverization residual rate can be 50% or more by specifying value range of a-axis length and C-axis length at each range of ABx is unexpected effect to one skilled in the art.”.

In response, the Examiner notes that because Yasuda et al. ('059) discloses (Examples) and Kaneko et al. ('517) discloses (col. 5, line 60 – col. 6, line 14) substantially the same composition and substantially the same process (casting and vacuum heat treatment this property would be expected. MPEP 2112.01 I. Furthermore, the language “when a hydrogen storage alloy is ground...” is language that suggests or makes optional but does not require steps to be performed. MPEP 2111.04.

Response to Arguments

Applicant's arguments filed 7 July 2009 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that Yasuda et al. ('059) does not teach or suggest the claimed low cobalt hydrogen storage alloy, represented by the general formula $MmNi_aMn_bAl_cCo_d$ wherein $4.0 \leq a \leq 4.3$ and Yasuda et al. ('059) clearly teaches away from the claimed invention by stating that “the ratio of Ni, a, is from 4.0 to 4.3, desirably from 4.1 to 4.2. If a is less than 4.0, the discharge characteristics are not satisfactory. If it exceeds 4.3, deterioration in insusceptibility to grain size reduction or life characteristics is observed”.

In response, the Examiner notes that although Yasuda et al. ('059) discloses that the preferred range for “a” is 4.0 to 4.3 and the more preferred range is desirably from

4.1 to 4.2, it would have been obvious to use amounts of "a" greater than 4.3 where optimized life characteristics are not required. A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use. MPEP 2123 II.

Second, the Applicant primarily argues that the pulverization residual rate of the low cobalt hydrogen storage alloy of independent claim 11 is a property of the low cobalt storage alloy and not a method of manufacturing a low cobalt hydrogen storage alloy and the structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art.

In response, the Examiner notes that because Yasuda et al. ('059) discloses (Examples) and Kaneko et al. ('517) discloses (col. 5, line 60 – col. 6, line 14) substantially the same composition and substantially the same process (casting and vacuum heat treatment this property would be expected. MPEP 2112.01 I. Furthermore, the language "when a hydrogen storage alloy is ground..." is language that suggests or makes optional but does not require steps to be performed. MPEP 2111.04.

Third, the Applicant primarily argues that Kaneko et al. ('517) does not teach or suggest a low cobalt hydrogen storage alloy with a composition $5.25 \leq a+b+c+d \leq 5.30$, wherein the a-axis length of the crystal lattice is not less than 500.5 pm and not more than 502.7 pm and the c-axis length is not less than 405.6 pm and not more than 406.9 pm as required by independent claim 11.

In response, Kaneko et al. ('517) discloses a rare earth metal-nickel hydrogen storage alloy having a composition represented by the formula $RNi_aMn_bCo_cAl_dX_e$,

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wherein R stands for one or more rare earth elements including Sc and Y and misch metal may be used as a starting material for industrial production (abstract and col. 4, lines 30-40); X stands for one or more elements selected from the group consisting of Fe, Cu, Zn, V, and Nb (abstract); a, b, c, d, and e satisfy the relations of $3.9 \leq a < 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract). Because Kaneko et al. ('517) discloses (col. 5, line 60 – col. 6, line 14) substantially the same composition and substantially the same process (casting and vacuum heat treatment the same crystal lattice lengths would be expected. MPEP 2112.01 I.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793

/JR/

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